

# From fresh Breathe to hot Savannah

MARIN plays a challenging role in the launch of Savannah, the world's first hybrid superyacht – 'a yacht full of premiers'. Enrico Della Valentina, e.valentina@marin.nl

Back in 2011, a paper outlining the pioneering 'Breathe' concept – a sustainable and innovative design for a large displacement motor yacht – was published by the Royal Institute of Naval Architects [1].

The concept was designed by De Voogt Naval Architects. They started with a slender hull form and then added unusual and innovative elements to the design such as a contra-rotating propulsion system, rudders used as stabiliser fins, a special engine train and a wave energy extraction system. MARIN was asked for advice on the proposed propulsion system.

Then renowned custom superyacht designer and builder Feadship, which is a cooperative venture between two shipyards and De Voogt Naval Architects, was fortunate enough to have a very open minded client who was willing to take the unique Breathe concept on board and help turn it into reality.

This resulted in the 83.50 m Savannah, the first superyacht to feature an eco-friendly blend of single diesel engine, three gensets, batteries, propeller, azimuthing thruster and the streamlined hull shape. Savannah has one efficient medium-speed Wärtsilä main engine, a single central propeller shaft installation on the centreline and three gensets. The result is fuel savings of some 30%.

The propulsion system had been used only once before on a ferry in Japan so its application on a motor yacht is truly novel. Many things needed to be thoroughly investigated by MARIN such as the interaction between the central propeller and the contra-rotating propeller of the thruster and the effect of the side rudders. The requirements in terms of efficiency, vibration level and manoeuvrability were the very highest.

In 2013 MARIN picked up again this challenging project, which meant that together

with De Voogt Naval Architects they had to cooperate in an unprecedented way to define completely new model tests and to translate the results into applicable solutions.

The yacht models underwent various numerical calculations including extensive CFD and were tested in MARIN's basins for calm water performance, seakeeping and manoeuvring behaviour and cavitation and pressure pulse characteristics. This resulted in a huge amount of data. The suppliers selected by Feadship did a great job with MARIN's information.

MARIN congratulates Feadship on the successful launch of Savannah and it hopes that they can again work together on such a forward-thinking project in the future and push the hydrodynamic boundaries back once more. ▢

## 1. BREATHE CONCEPT; ECONOMIC SUSTAINABILITY

R. Schouten, De Voogt Naval Architects, The Netherlands.  
G. Loeff, Maritime Research Institute Netherlands,  
The Royal Institution of Naval Architects, 2011



126/78

